Comparison of Place Bonding Models in Recreation Resource Management

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Abstract

Conceptual studies of place bonding have often stopped short of verifying the relationship of scales/models to other relevant recreation behavior variables. The current paper addresses this concern by comparing three models (full, parsimonious, and partial models) of place bonding and their scale measurement to a dependent variable, experience use history (EUH), for degree of predictive validity. Results reveal that the full and parsimonious place bonding models predicted more EUH variance than the partial model. Because the parsimonious model's fit and psychometric properties were as good as the full model, the parsimonious model is recommended over the other models. The parsimonious scale provides researchers with a robust and nuanced measure of people's attachment to place.

KEYWORDS: Place bonding, experience use history, predictive validity, outdoor recreation, scale measurement

Introduction

The study of affective bonds between humans and places first appeared in the scientific literature in 1963 (Fried, 1963). Since then seminal books (Altman & Low, 1992, Relph, 1976) and articles (Giuliani, 2003; Stokols & Shumaker, 1981) have appeared on the topic. To date, the majority of this environmental psychological literature on place/human interaction has concentrated on topics of conceptualization, terminology, theory, and developmental context.

Place attachment and/or bonding in the recreation resource management literature is only 15 to 20 years old, but has been a prominent topic during the last 15 years based on its managerial implications (Kruger, Hall, & Stiefel, 2008; Kruger & James, 2003; Williams & Stewart, 1998). Much of the literature in the recreation and leisure field has focused on conceptualization of attachment during leisure, the relationship of attachment to other recreation behaviors, and scales/models for measuring the place attachment/bonding phenomenon (Hammitt, Backlund, & Bixler, 2006; Stedman, 2003; Williams & Vaske, 2003). Compared to the fairly well developed conceptualization of place attachment, work focusing on both its ability to predict other recreation behaviors and scale measurement issues remain substantial research topics. Particular interest is the potential utility of place bonding as a predictive construct in human–place relationships. Additionally, scales developed for measuring place attachment/bonding have provoked considerable interest among researchers concerning which measures provide the most valid and reliable assessment of the construct.

The conventional attachment model used in recreation resource management has been the two dimensional (i.e., place identity and dependence) model of Williams and colleagues (1992). Several other scales/models have appeared in the literature, varying in the number of dimensions from three (i.e., attachment, place identity and dependence) (Jorgensen & Stedman, 2001) to four (i.e., social bonding, affective attachment, place identity and dependence) (Kyle, Mowen, & Tarrant, 2004) to five (i.e., familiarity, belongingness, rootedness, place identity and dependence) (Hammitt, et al., 2006). At issue with the various scales/models and associated number of place attachment dimensions is: which model is better in terms of construct and predictive validity? That is, which model most adequately captures the universal meaning of place attachment/bonding, and which model is better at predicting behavior of other recreational phenomena?

The purpose of this study was to compare the utility of three place attachment/bonding models for explaining variance in an associated recreation behavior construct, experience use history (EUH). The paper is an extension of earlier work that concentrated on the conceptual and empirical development of a recreation place bonding model and scale (Hammitt et al., 2006). Specific objectives were to: (a) fit empirical data from two field studies to place bonding measurement models (e.g., confirmatory factor analysis), (b) examine place bonding's relationship to EUH, and (c) compare full, reduced (parsimonious), and partial place attachment/bonding models at predicting EUH. The place bonding models were used as the independent variable in the comparisons since the direct purpose of the study was to compare the place bonding models, rather than to compare the effect of various models of EUH on place attachment. These analyses extend beyond a limited examination of the scale's psychometric properties; for a perfectly fitted scale measure to a theoretical model is quite limited in utility if the theoretical model is not related and/or predictive of recreational behavior. We chose EUH as the specific recreation behavior of interest given the concept's previously reported relationship with attachment constructs (Hammitt et al., 2004; 2006). This work has shown that people's attachment to place both emerges through extended place interaction in addition to being a motivator of their continued place interaction.

Extension of Previous Work

Leisure and recreation research is founded on the premise that it should have a theoretical and/or conceptual foundation to guide operationalization of measurement for data collection. Thus, it is only natural that much of the recreation literature is devoted to the conceptual and developmental stages of construct modeling and scale development. Various statistical procedures and applications aid greatly in the conceptual and developmental stages of construct models and measurement scales. For example, exploratory factor analysis (EFA) is commonly used in the development of reliable scale items, confirmatory factor analysis (CFA) is used to verify the fit or association of scale items to the theoretical constructs measured, and structural equation modeling (SEM) is employed to examine the path relationships among multiple constructs and scale items within conceptual models (Hayduk, 1987). However, an acceptable or even well-fitting measure is quite limited in its utility if the theoretical model is not related and/or predictive of an associated recreation behavior. This paper addresses the utility of a proposed place bonding measure both in terms of its psychometric properties and its ability to account for recreation EUH behavior.

DeVellis (1991, p. 51–80) outlined a series of steps to follow during the development of psychometric models and scales. In previous work (Hammitt et al., 2006), we followed the steps of scale development and construct validity testing outlined. Presented in that paper was a theoretical/conceptual understanding of a five-dimensional model of place bonding (Step 1), a pool of 26-items to measure the five theoretical dimensions (Step II), the testing and analysis (EFA) of the scale items with a sample of trout anglers (Step III) and an evaluation of the proposed model and scale for reliability and validity (CFA). Preliminary evaluation of convergent and predictive validity was also conducted with the sample of trout anglers (Hammitt et al.).

The current paper is an extension of the previous work in that three models of place bonding/attachment, rather than one, are examined for construct and predictive validity. It is an extension also in the sense that two samples of respondents (e.g., campers and anglers), rather than just anglers, are included to provide an element of robustness to the comparative study. Perhaps most importantly, it is an extension in that it moves beyond exploratory and confirmatory analysis of scale development, toward the next step of verifying the relationship of place bonding to other behavioral constructs and associated recreation behavior.

Concepts Compared

Place Bonding versus Place Attachment

The first issue to clarify is the difference, if any, between the concepts of place bonding and place attachment. Theoretically, both concepts deal with the emotional and cognitive tie or coupling that develops during human/place interactions (Roberts, 1996; Shumaker & Taylor, 1983; Sime, 1995). The major difference between the two concepts may be derived from the academic disciplines from which they developed, or their developmental history. Place bonding, or at least the concept of bonding, seems to have its origins in the field of social psychology and study of interpersonal interactions (Bowlby, 1969; Walster & Walster, 1978). On the other hand, place attachment is a more recent concept with its roots in the fields of environmental psychology/geography and the study of people–place interactions (Low & Altman, 1992; Stokols & Shumaker, 1981). Steel (2000) considers the two concepts to be interchangeable, stating that if the word person is substituted for the word place in many theoretical orientations of place attachment, it becomes apparent that the dimen-

sions of place attachment are parallel to those of interpersonal bonding and attachment. However, Giuliani (2003) goes to great lengths to discuss the theoretical aspects of bonding, attachment, attachment to people, attachment to places, and concludes there is a difference between personal attachment and place attachment. Giuliani's major difference is that "interpersonal bonding infers persistence and conceptualizes the phenomenon as static, while place theorists emphasize the dynamic relationship between person and place." We find it difficult to agree with Giuliani's argument that place bonding, at least in outdoor recreation environments, is static and not dynamic. Rather, the bonding that occurs in many people-place interactions can be quite dynamic and developmental (Hazen & Shaver, 1987; Low & Altman, 1992). The dynamic nature of the people-place relationship was also highlighted in Manzo's (2003) extensive review of the place literature. Her review identified terms used by other authors that emphasize its fluidity over time; e.g., movement, rest and encounter (Seamon, 1993), journey (Seamon & Mugerauer, 1985), continuity (Twigger-Ross & Uzzell, 1996), developmental (Hay, 1998), and deepening (Relph, 1976). Thus, for these reasons, we have chosen to adopt a place bonding orientation for comparing various measurement models of place interactions. In addition, since the model testing of this paper is an extension of prior conceptual work on recreational place bonding, it is only logical that a boding orientation should guide the model comparison of this paper.

Recreation Place Attachment

The first scale/model to measure recreation resource place attachment appeared in the literature in 1989 (Williams & Roggenbuck, 1989). This two dimensional model of place identity and dependence has been the conventional and most prominently used attachment model by recreation resource researchers (Bricker & Kerstetter, 2000; Moore & Graefe, 1994; Moore & Scott, 2000; Warzecha & Lime, 2001; Williams & Vaske, 2003). Due to the multi-dimensional aspects of the place concept, however, various researchers have added dimensions to the model, such as place or affective attachment (Jorgenson & Stedman, 2001; Kyle et al., 2004) social bonding (Kyle, Graefe & Manning, 2005), and familiarity, belongingness, and rootedness (Hammitt et al., 2006). However, all of these scale/models have retained a measure of place identity and dependence as their core.

It is not practical, nor is it the purpose of this paper to discuss and compare all the various scales/models in the recreation resource literature. Rather, two extremes in number of dimensions per model have been selected for comparison; the two dimensional model of identity and dependence versus the five dimensional model of identity, dependence, familiarity, belongingness, and rootedness. A parsimonious model of the five dimensions, containing less scale items per dimension was also selected for the comparison.

The individual scale items in each dimension compared in the three models are listed in Table 1. A brief conceptual definition of the model dimensions follows:

Place identity = those dimensions of self that define the individual's personal identity in relation to the physical environment by means of a complex pattern of conscious and unconscious ideals, beliefs, preferences, feelings, values, goals, and behavioral tendencies and skills relevant to this environment (Proshansky, 1978: p.155).

Place dependence = an occupant's perceived strength of association between him or herself and a specific place…a two component process by which occupants assess the quality of the current place and the relative quality of comparable places (Stokols & Shumaker, 1981: p.547).

Place familiarity = pleasant memories, attribute and cognitive meanings, and environmental images that result from acquaintances and remembrances associated with recreation places (Roberts, 1996; Stedman, 2003).

Place belongingness = a feeling of affiliation with place, a social bond where people feel as though they are connected and hold 'membership' with an environment (Mesch & Manor, 1998; Milligan, 1998).

Place rootedness = a strong and focused bond that "in its essence means being completely at home—that is, unreflectively secure and comfortable in a particular location (Tuan, 1980, p.4).

Experience Use History

The conceptualization of experience use history (EUH) has been driven by the premise that experienced users should have a substantially greater knowledge base concerning activities and/or resource places, are more place familiar, and therefore have a richer cognitive, and perhaps affective, basis for evaluating resource settings and use (Manning, 1999; Schreyer, Lime, & Williams, 1984). Thus, EUH has commonly been used as an independent variable that influences related recreation behaviors, such as place attachment/bonding. There is a considerable body of evidence indicating that repeated and lasting place interaction fosters emotional ties to place (Buttimer, 1980; Hay, 1998; Relph, 1976; Seamon, 1993; Twigger-Ross & Uzzell, 1996). However, it would also be reasonable to argue that emotional and cognitive attachment with a place should be related to a desire to experience a place more often, thus serving as a dependent variable.

For example, several environmental psychology theories related to emotional and cognitive elements of human-environment interactions posit that familiar, preferred, and satisfying interactions with a place lead to a desire to visit such places more often (Kaplan & Kaplan, 1982, 1989). Even the traditional place attachment dimensions of identity and dependence should lead one to visit attached place more often (Williams & Roggenbuck, 1989). To identify with and depend on a place makes it special from other places, and it is often the special and unique places that we easily bond with and desire to re-visit. The cognitive and mental structures/models that develop during place bonding processes should influence our desire to experience these places again and again. While not directly testing this proposition, Kyle et al. (2004) tested a model that had several dimensions of "place motivation" predicting place attachment within an outdoor recreation context. Adapting Driver and colleagues' (Driver & Knopf, 1977; Driver & Tocher, 1970; Driver, Tinsley, & Manfredo, 1991) recreation experience preference scales to operationalize place motivation, they hypothesized that their respondents' desire to return to a place was driven by their pursuit of specific experiential outcomes gained through place interaction. The attainment of these outcomes had a positive effect of their respondents' attachment to place and intention to return.

Since EUH refers to amount of past use experience, it has usually been operationalized in terms of number of total visits, total years of use, and frequency per year of participation with an activity and/or resource at a specific site and/or other sites (Hammitt & McDonald, 1983; Hammitt et al., 2004; Schreyer et al., 1984). EUH is usually considered a unidimensional concept, with the individual past experience EUH measures combined to form an index value of past use history.

Methods

Study Areas and Respondents

Two independent study data sets were used in the comparative analysis. The one involved campers to the Sumter National Forest near Walhalla, SC. Campers to three diverse types of camp settings (developed campground, walk-in/pioneer camp area, and designated wilderness) were surveyed (Cavin, 2004). Sampling occurred between May and October, 2003. A questionnaire was distributed to all campers encountered on-site and was collected later the same day or the next day. A total of 506 campers were approached. In instances where a camper (i.e., wilderness users) was encountered on the trail or as they were hiking away from camp, they were provided with a postage-paid envelope to return the survey. In total, 424 completed questionnaires were obtained for data analysis, for an 83.7% response rate. The campers averaged 39 years in age and were somewhat experienced campers (e.g., years camping at site = 6.4, frequency last year at site = 1.4 times, total times camping at site = 10.5). The second data set involved trout anglers of the Chattooga National Wild and Scenic River, located adjacent to the Ellicott Rock Wilderness Area where the wilderness campers were sampled in the first study. Thus, the three camp settings and the river setting for the two data sets were all located within a 5 mile radius. The angler respondents (n = 203) were members of two local chapters of Trout Unlimited and were surveyed by mail (71% response rate) during 2001 (Hammitt et al., 2004). The anglers were an older ($\overline{X}$ age = 54 years) and more experienced group (e.g., years fishing at site = 15, frequency last year = 10 times).

Variables and Scales

The recreation place bonding measure consisted of 26-items, rated on a 5-point scale of agreement (1 = strongly disagree, 5 = strongly agree). The multi-dimensional scale was developed to measure the five conceptualized dimensions of place bonding (e.g., familiarity, belongingness, identity, dependence, rootedness) and has been factor analyzed (both EFA and CFA) in the past (Hammitt et al., 2004, 2006). The EUH measure consisted of three, ratio measures of past site use for the campers (i.e., years of use, frequency last year, and average use frequency per year) and two for anglers (i.e., frequency last year, and average use frequency per year).

Data Reduction and Confirmation

The three EUH items were factor analyzed (EFA) to determine their unidimensionality and internal consistency as a construct variable. All items had factor loadings above .72 and the Cronbach alpha for campers was .70 and .76 for anglers.

CFA was used to test the fit of the 26 item bonding scale to the five dimension theorized model of place bonding. The hypothesized recreation place bonding model was examined with familiarity, belongingness, identity, dependence, and rootedness as latent variables with corresponding scale items as indicator measures. Five goodness of fit indices' were utilized in testing the fit of the hypothesized model: chi-square/degrees of freedom ratio (χ^2/d.f.), comparative fit index (CFI), normed fit index (NFI), non-normed fit index (NNFI), and root mean square error of approximation (RMSEA). Acceptable range values for the fit indices, according to Hu and Bentler (1998) are χ^2/d.f. ≤ 3.00; CFI, NFI, NNFI ≥ 0.90; RMSEA ≤ 0.08. Analysis was performed using the EQS 6.1 for Windows statistical package.

Previous CFA (Hammitt et al., 2006) of the 26 item scale with the angler data set suggested that a better fitting model could be obtained if two items were dropped from the 26-item scale (LaGrange multiplier modification) (see Table 1). As a result, the 24 items were used in the comparative analysis of the full model. The parsimonious model used in the comparative analysis consisted of 15 items, three per each of the five bonding dimensions. Criteria for selecting the three items per bonding dimension were based the strength of the factor loadings from Hammitt et al.'s work and other research using similar items (Jorgensen & Stedman, 2001; Williams et al., 1992; Williams & Vaske, 2003).

The two dimensional-partial model consisted of 12 items, being six place identity and six dependence items typical of the Williams and colleagues (1992) place attachment scale. The 12 items from the Williams and colleagues scale represented the identity and dependence items in the full model of 24 items. Thus, the partial model in the comparative analysis was a sub-set of the larger full model. The three CFA models (i.e., full, parsimonious, and partial models) were then compared for their predictive validity with EUH. The items in each of the three models and a conceptual scheme for the full model analysis are presented in Table 1 and Figure 1, respectively.

Results

Fitting Empirical Data

The first study objective was to test the fit of the camper and angler scale data to the hypothesized place bonding models that were to be compared. Based on the fit value standards stated in the Methods (Hu & Bentler, 1998), the place bonding items represent an adequate to excellent fit to the hypothesized five dimensional model of recreation place bonding, and the two dimensional model of place attachment (Table 2). For example, the χ^2/d.f. ratios are below 3.0 except for the camper full model; the CFI, NFI and NNFI values are all $\geq$ .95 except for the angler full model; and the RMSEA values are all below .08 except for the camper full model. When the full model was reduced to the 15 item parsimonious model, the three exception value standards in the previous sentence were met (see fit indices for parsimonious model in Table 2).

Model Relationships and Comparisons

Full Model. Figure 2 displays the relationships between the five bonding dimensions and the latent place bonding construct, the three EUH variables and the EUH latent construct, and the predictive relationship of place bonding to EUH. For campers, place bonding explained 40% of the variance in EUH, and 34% for anglers. Place identity (β = .94) best accounted for variance in place bonding, followed by place belongingness (β = .84) and dependence (β = .81). Times per year and total years of use at the site were most related (β = .75) to EUH. Fit index values reveal a good to excellent fit between the data and conceptualized full model.

Parsimonious Model. Although the parsimonious model consisted of only 15 variables (i.e., three per each of the five dimensions instead of the 24 of the full model, the results of the two models are very similar (Figure 3). The R^2 for campers (.39) and anglers (.32) in the parsimonious model are not much different from the .40 and .34 of the full model. Also, the same basic pattern of explained variance exists between the dimension variables and the latent constructs of place bonding and EUH.

TABLE 1

Items included in the full, parsimonious, and partial place bonding model comparison. (The items are worded for the trout angler study; camping and specific camp settings were substituted for the camper study.)

Factored dimension Item	Full Model	Parsimonious Model	Partial Model
Place Familiarity			
I could draw a rough map of the Chattooga	X	X	
I have trout fished the Chattooga many times and I am quite familiar with it	X	X	
I know the Chattooga like the back of my hand	X	X	
Place Belongingness			
I feel connected to the Chattooga	X	X	
I am fond of the Chattooga	X		
The Chattooga makes me feel like no other place can	X		
When I am at the Chattooga, I feel part of it	X	X	
I feel like I belong at the Chattooga	X	X	
Place Identity			
The Chattooga is very special to me	X		X
I am very attached to the Chattooga	X	X	X
The Chattooga means a great deal to me	X	X	X
I identify strongly with the Chattooga	X	X	X
Visiting the Chattooga says a great deal about who I am	X		X
I feel like the Chattooga is part of me	X		X
Place Dependence			
The Chattooga is the best place for trout fishing	X		X
Trout fishing on the Chattooga is more important to me than trout fishing any other river	X	X	X
No other place can compare to the Chattooga for trout fishing	X		X
I wouldn't substitute any other area for the trout fishing I do at the Chattooga	X	X	X
I get more satisfaction out of trout fishing the Chattooga than from trout fishing any other river	X	X	X
The trout fishing I do at the Chattooga I would enjoy just as much at a similar river or stream	X		X
Place Rootedness			
The Chattooga is the only place I desire to trout fish	X	X	
I rarely if ever trout fish any place other than the Chattooga	X	X	
If I could not fish the Chattooga I would stop trout fishing	X		
I consider only the Chattooga when I go trout fishing	X	X	

Two items were dropped from the scale, based on LaGrange Multiplier results. They were Familiarity item, 'I have many memories of trout fishing on the Chattooga' and Rootedness item, 'The Chattooga is like a home to me.'
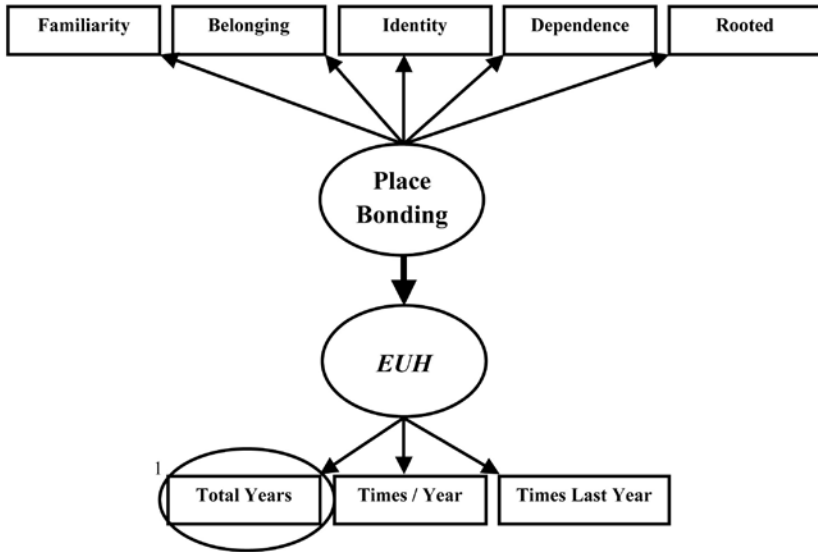
FIGURE 1. Conceptual scheme for the structural equation modeling analysis between place bonding and experience use history.1 Note: The experience use history latent variable for the camper data set consisted of all three EUH measures, while the trout angler data set did not include the measure, Total Years.

TABLE 2

Confirmatory Factor Analysis fit indices for camper and trout angler comparative models of place bonding.

Fit Indices	Data Set	
	Campers	Anglers
Full Model:		
X^2/d.f.	739.97/196	357.06/237
CFI	.98	.96
NFI	.98	.90
NNFI	.98	.96
RMSEA	.087 (CI: .081 – 0.93)	.053 (CI: .041 – .064)
Parsimonious Model:		
X^2/d.f.	231.41/79	105.14/80
CFI	.99	.99
NFI	.98	.95
NNFI	.99	.98
RMSEA	.069 (CI: .059 – .079)	.041 (CI: .013 – .061)
Partial Model:		
X^2/d.f.	109.09/38	65.39/50
CFI	.98	.99
NFI	.97	.96
NNFI	.97	.99
RMSEA	.069 (CI: .054 – .084)	.041 (CI: .000 – .066)
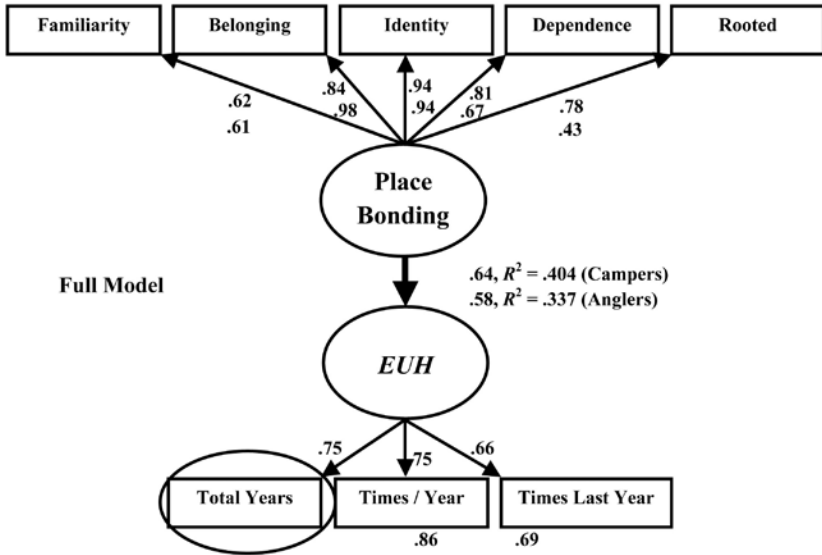
$\chi^2 = 41.43, d.f. = 14, RMSEA = .072$ (CI: .047–.098), NFI = .98, NNFI = .97, CFI = .99
$\chi^2 = 14.91, d.f. = 8, RMSEA = .074$ (CI: .000–.0131), NFI = .98, NNFI = .97, CFI = .99
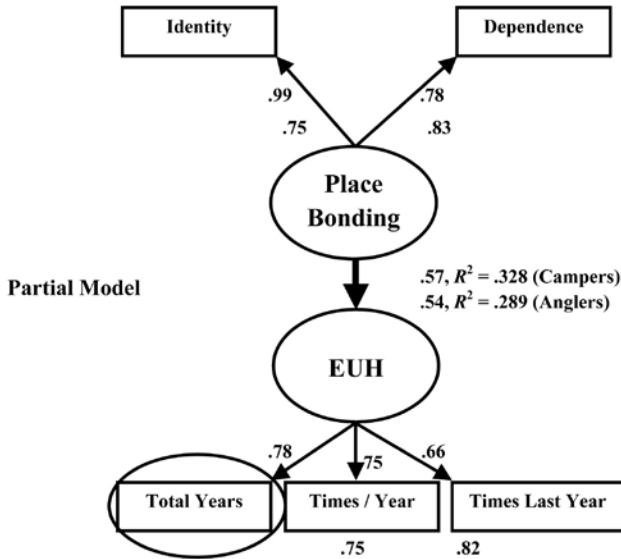
FIGURE 2. *Structural equation model analysis for the predictive relationship between the place bonding full model and experience use history (EUH).*
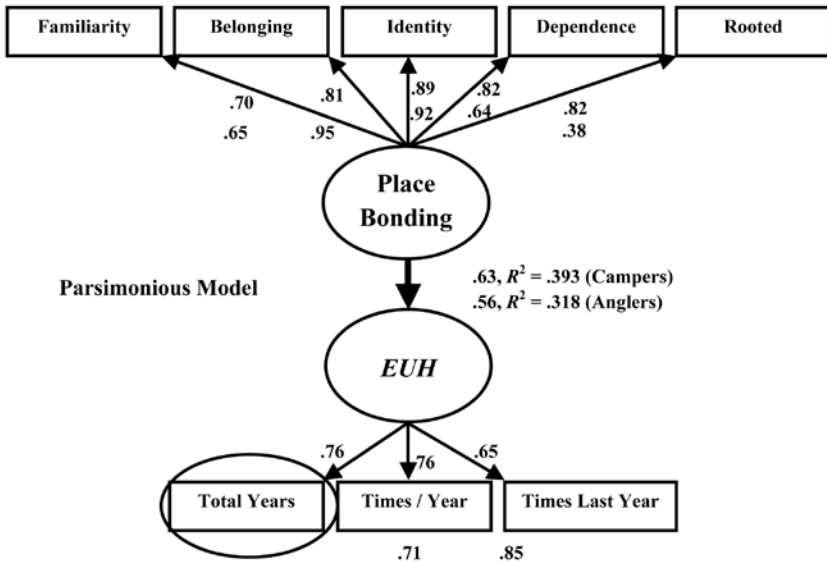
$\chi^2 = 33.26, d.f. = 13, RMSEA=.063$ (CI: .037–.090), NFI=.99, NNFI=.98, CFI=.99
$\chi^2 = 11.14, d.f. = 8, RMSEA=.050$ (CI: .000–.0113), NFI=.98, NNFI=.99, CFI=.99

FIGURE 3. *Structural equation model analysis for the predictive relationship between the place bonding parsimonious model and experience use history (EUH).*

Partial Model. The partial model of 12 variables representing the two traditional place dimensions of identity and dependence accounted for 33 (campers) and 29 (anglers) percent of the variance in EUH (Figure 4). Compared to the full and parsimonious models, the partial model explains about 7% less of EUH for campers and 5 to 3%, respectively, less for anglers. Identity accounts for most of the variance in place bonding (β = .78). There is little difference from the other two models in variance explained between the EUH variables and the latent EUH construct.

$$\chi^2 = 6.67, d.f. = 3, RMSEA = .057 \text{ (CI: .000-.115), NFI=.99, NNFI=.98, CFI=.99}$$
$$\chi^2 = .931, d.f. = 1, RMSEA = .000 \text{ (CI: .000-.206), NFI=.99, NNFI=1.00, CFI=1.00}$$

FIGURE 4. *Structural equation model analysis for the predictive relationship between the place bonding partial model and experience use history (EUH).*

Model Comparison. The predictive validity comparisons among the full, parsimonious, and partial place bonding models for the two data sets are summarized in Table 3. There was little difference between the 24 item full model and the 15 item parsimonious model. This was particularly true for campers, where the beta and R^2 values were essentially the same (β s = .64, .63, R^2 = .40, .39). The comparison between the full or parsimonious models and the two dimensional partial model indicates a 7% decrease in variance predicted for campers when using the partial model and a 2 to 5% decrease for anglers.

TABLE 3
Summary table of comparative analysis results of three models of recreation place bonding for two user groups.

	Campers		Anglers	
Model	**Beta**	**R²**	**Beta**	**R²**
Full (5 dimensions)	.64	.404	.58	.337
Parsimonious (5 dimensions)	.63	.393	.56	.318
Partial (2 dimensions)	.57	.328	.54	.289

Discussion and Recommendation

This paper compared three models of place bonding and their scale measurement to a dependent variable, EUH, for degree of predictive validity. The differences in predictive validity of the three models were not great. As a consequence, it is difficult to recommend convincingly which model is best to use. Because the five dimension, 15-item parsimonious model was as predictive as the full model, we would recommend the parsimonious model over the full model. When deciding between the parsimonious and partial models, one has to ask if the 7% (campers) and 3% (anglers) gain in prediction of the parsimonious model over the partial model is advantageous enough to use it over the partial model. Another point to consider when deciding which model to use is construct validity. If one feels the 5-dimension, 15-item conceptualization of recreation place bonding captures more of the universal meaning of place bonding than the traditional 2-dimension, 12-item attachment conceptualization, then the parsimonious model with its 3 to 7% gain in EUH predictive validity is recommended. Many dimensions besides identify and dependence have been proposed by researchers when conceptualizing human–place attachment alluding to the proposition that a more robust and valid measure is needed for the construct. As with any research, construct validity is a major concern. Because the parsimonious scale only requires respondents to rate three more items over the partial scale, and provides information on three additional place dimensions, we would favor the parsimonious scale for use. As noted, these additional dimensions offer a more nuanced understanding of recreationists' ties to place. These dimensions provide additional insight as to why settings are important. This knowledge begins to shed light on the processes underlying the development of place ties. An understanding of the foundations of place bonding also allows natural resource managers to begin to manage settings in ways consistent with the meanings recreationists' associate with the setting. A potential next step for analyzing these data would then be to segment respondents into homogenous groups to explore variation in place meaning across the different activity groups. This procedure would identify potential use groups that extend beyond simple activity clusters by focusing on why the resource is important to the recreationist.

The finding that the amount of difference in predicted variance among the three models was similar raises some interesting conceptual/methodological implications. For example, is the lack of difference related to the convergent evolution and conceptualization of place bonding and place attachment in their respective disciplines? As alluded to earlier in the paper, some researchers consider the constructs to be interchangeable (Steel, 2000). Is it a scale item and dimension problem? The fact that all three models compared included place identity and dependence dimensions/scale items as their core may make the models too similar. Past research has shown that the place identity scale dominates most other place dimensions in predictive ability (Hammitt et al., 2006; Williams & Vaske, 2003). Place identity is such a

robust measure, no doubt consisting of several sub-dimensions of place bonding. Proshansky, Fabian, and Kaminoff (1983, p 60) state that place identity is a "combination of attitudes, values, thoughts, beliefs, meanings, and behavior tendencies reaching beyond emotional attachment and belonging to a particular place," thus indicating the complexity of identity as a scale measure. In terms of survey methodological implications, length of scales and questionnaires in general, are commonly a problem. The length of the 15-item parsimonious model is quite similar to the traditional 12-item partial model, meaning they should be equally easy to accommodate in questionnaires.

In the recreation field, it is rare for a line of research to reach the stage of predictive modeling. Our comparative analysis between recreation place bonding models and EUH extends our understanding between these two behavioral constructs. Much of the past research with place bonding/attachment has concentrated on the fitting of scale measures to theoretical models of attachment. Less of the research has taken the next step of testing the relationship and predictive validity of confirmed place models to various recreation behavior constructs. This model testing is essential, for a perfectly fitted scale measure to a theoretical model is quite limited in utility if the theoretical model is not related and/or predictive of recreational behavior. Previous research has called for such model testing. For example, what is the relationship of place bonding to willingness-to-pay, lack of perceived substitute places and sensitivity to resource impacts (Williams & Vaske, 2003), or how does the intensity and character of place bonding relate and/or predict site use patterns, site preference-choice, recreation site conflict, and public acceptance/support for management practices (Hammitt et al., 2006). Our study only compared the three place bonding models to EUH, but future research should compare various place models to other relevant recreation behavior constructs and phenomena.

The recreation literature has numerous examples of well fitted CFA scales that when subjected to SEM account for less than 10 percent of the variance explained. Not only did our study explain a fair amount of variance between place bonding and EUH, but it is one of the few studies that has examined the effect of place bonding on EUH. Most previous research has examined the influence of EUH on place bonding, since place bonding/attachment is conceptualized as a developmental process that occurs with time. However, as alluded to earlier in this paper, emotional attachment to a place is likely to lead to a desire to experience that place more often. Thus, besides the comparison of place models, our analysis extends our understanding of the place bonding to EUH relationship.

The study was limited in that the three models were examined for their predictive validity with only one associated variable, EUH. While the single dependent variable allowed for a preliminary comparison of the three models, a more comprehensive comparison will result from the use of other dependent variables in the future, as well as more indicator variables per latent dependent variable. The analysis involved two data sets to provide a test of stability across replication of the comparative models' results. The patterns of variation with each data set were stable, with the full and parsimonious models predicting more EUH variance than the partial model. However, future research should test these models with other data sets to confirm their behavior and stability. In addition, other models of place bonding/attachment could also be added to future comparative analyses.

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